

ENVIRONMENTAL HEALTH PROJECT

Activity Report 107

**Developing a Hygiene Behavior Change
Program for Children with Lead Poisoning
Living in Informal Urban Areas of
Lima, Peru**

by

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About the Author

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He has a master's degree in communications from Northwestern University (1978). He worked at the International Communications Center for Latin America (CIESPAL) and participated as an instructor for radio courses and workshops with the International Radio Netherlands team for six years in Ecuador and Costa Rica at their training centers.

He was invited to head of the Communications Directorate of the Inter-American Institute for Cooperation on Agriculture, Organization of American States, in Coronado, Costa Rica, where he stayed for two years. He managed a radio station in Quito, Ecuador. He directed the Audiovisual Center at the Catholic University in Quito and offered lectures and academic support to other universities in Latin America. He is author of texts for radio and mass and interpersonal communications.

Since moving to the United States in 1966, he has contributed technical assistance to projects funded by the U.S. Agency for International Development (Opportunities for Micronutrient Intervention [OMNI], CHANGE, and Basic Support for Institutionalizing Child Survival [BASICS]) and is working with various agencies (HOPE, Pan American Health Organization, UN Children's Fund [UNICEF], Organization of American States). Under World Bank funds he has worked in Peru, Venezuela, Paraguay, Bolivia, and Nicaragua, taking part in assessments and assisting team missions.

During the past year he has worked with special dedication in Environmental Health Project (EHP) activities, assisting government agencies and nongovernmental organizations in the preparation of strategies using social marketing communications for improving sanitary behaviors to diminish diarrhea and lead poisoning in Peru and the Dominican Republic.

At present he is part of the Community-Based Environmental Sanitation and Hygiene (CESH) team at EHP, offering advice in communications, education, and behavior change matters, and he is collaborating in a regional joint venture on sanitation with EHP and the Pan American Health Organization.

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Let the list that comes next be a testimony of their dedication to this activity. The author apologizes for involuntary omissions and ignorance of the names of other relevant persons who also participated in the activities.

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Administrative and Technical Staff Assigned to This Project from EHP

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Abbreviations

CDC	Centers for Disease Control and Prevention
CORDELICA, Lima	Callao Council for Development (this organization is no longer active; correspondence in Spanish: Corporación de Desarrollo del Lima-Callao)
DIGESA	Environmental Health General Directorate (part of the Ministry of Health of Peru and managed environment and occupational health; correspondence in Spanish: Dirección General de Salud Ambiental)
EHP	Environmental Health Project
ESLIMP	Municipal Bureau for Garbage Collection (office in charge of cleaning streets and collecting of garbage in the Municipality of El Callao; correspondence in Spanish: Empresas de Servicios de Limpieza Municipales)
INSO	National Institute for Occupational Health (formerly [July 2001] part of DIGESA; the new administration gave independent functioning to this institute; correspondence in Spanish: Instituto Nacional para la Salud Ocupacional)
IQ	intelligence quotient
NGO	nongovernmental organization
TDY	temporary duty
TIPs	trials for improved behaviors
USAID	U.S. Agency for International Development

Executive Summary

Background. In 1998–1999 a study of blood-lead levels of postpartum women and children in poor areas of Lima and Callao was conducted by the Government of Peru's Environmental Health Division of the Ministry of Health (DIGESA). A key study finding was that 29 percent of the children sampled had blood-lead levels above 10 µg/dL (micrograms per deciliter), the cut-off level recommended by the American Academy of Pediatrics. Likewise 24 percent of the postpartum women showed levels higher than 10 µg/dL. Postpartum women were tested to obtain information regarding prenatal exposure and to estimate blood-lead levels of their babies.

Blood-lead levels varied by province, with Callao showing significantly higher than Lima: 7.1 µg/dL versus 15.2 µg/dL. Most strikingly, however, blood-lead levels of children and mothers living in close proximity to a shipping port and storage area for mineral concentrates in Callao were very high. The mean was 25.6 µg/dL for children in schools near the port and storage areas. Among the postpartum women, two who lived near the mineral storage areas had blood-lead levels nearly two times higher than other women screened.

Water samples in the vicinity of the port and storage areas were within normal limits for lead; however, the lead concentrations in dust were high: 30 percent of the tested samples were above the recommended value of 500 ppm (parts per million). Children's behaviors, such as consuming soil, sucking pencils, placing hands in the mouth, etc, increased their exposure to lead. Inverse relationships between school performance and anthropometry and blood-lead levels were documented.

The study, which was supported by the U.S. Agency for International Development (USAID) through the Environmental Health Project (EHP), recommended four activities to follow up on the study: (1) clarification of the sources of lead contamination, (2) further testing of blood-lead levels among residents and workers in the storage areas, (3) steps to reduce exposure through community education, nutritional supplements, and improved management of dust problems, and (4) strengthening of DIGESA's capabilities.

Acting on the first recommendation, in early 2000, USAID supported a more detailed study to clarify the sources of lead contamination through isotope methodology. The study screened children six months to seven years of age in neighborhoods nearby the storage areas. High blood-lead levels were found—54 percent had values above 20 µg/dL—and the source was deemed to be dust from the storage areas. These results underlined the urgency of taking action to decrease exposure.

The Behavior-Change Project. Accordingly, EHP was asked to carry out a behavior change effort to reduce lead exposure among children as part of USAID/Peru's Urban Environmental Health and Hygiene Behavior activity. The purposes of the project were to provide training and guidance to DIGESA as it . . .

- Designed, implemented, and analyzed formative research.
- Designed a behavior-change program, developed educational materials, and tested the feasibility of certain behaviors for reducing blood-lead levels.
- Implemented, monitored, and evaluated the program.

The project team consisted of a behavior change specialist, who worked with DIGESA personnel in Peru; a lead-poisoning expert, who was the U.S.-based resource; and a local consultant, who assisted DIGESA with coordination. The general approach was for the behavior change consultant to present a workshop, which would be followed up by DIGESA personnel applying what they had learned. In this way, they would learn new skills while also implementing a behavior-change activity.

The area chosen for the project was Puerto Nuevo, a slum neighborhood of about 6,000 residents on the north side of Callao, settled informally in the 1940s when the port facilities were first constructed, but still today lacking basic services and infrastructure, rife with crime and violence, and contaminated with toxic substances from nearby factories, the port and storage area, and the close-by airport. It proved to be a very challenging area to work in.

Public Health and Behavioral Goals. The project's public health goal was to diminish blood-lead levels among the population of Puerto Nuevo, especially among its 500 children under six. No specific target reduction was specified. The behavior-change goals were to reduce oral ingestion of dust containing lead particles transported by air, food, utensils, and hands, through interrupting the contaminate-mouth pathway.

Behavior-Change Strategy Development. DIGESA assigned to the project a sixteen-person team of social and scientific experts from among its ranks. Many specialties were represented: engineering, psychology, biology, sociology, social work, nutrition, medicine; however, none had behavior-change experience.

The project began in August 2000 with formative research carried out by DIGESA personnel after a training workshop. Through focus group discussions, household and community observations, and interviews of residents, several themes were investigated. Key findings were:

- Low community perception of the seriousness of the lead poisoning problem.
- Poor hygiene in homes—especially, poor hand washing, food preparation, and house cleaning practices (exacerbated by lack of water supply and sanitation and poorly constructed homes).
- Virtually no provision for hand washing at schools.
- Lack of community organizations.

Based on the findings from this research and subsequent trials of improved practices (TIPs), seven key behaviors to promote among mothers and child caregivers were identified in January 2001.

1. Wash your own and your children's hands with water and soap before meals.
2. Cut your children's fingernails once a week.
3. Before eating, wash fruits and vegetables with running water or in a basin until the water runs clear.
4. Bathe your children and change their clothes every time they play outside.
5. Wash toys before giving them to children.
6. Before using, wash kitchenware and utensils.
7. Avoid dust penetration by closing cracks or holes in external walls or roofs.

The behavior-change strategy had two basic elements: monthly visits by health workers, or promoters, to educate families about behaviors to prevent lead ingestion, followed up by periodic blood tests to monitor the impact of behavior change.

The DIGESA team developed a package of materials to promote these key behaviors and formulated a strategy for the behavior-change effort.

Current Status. After a third workshop in June 2001, which focused on plans for implementation and development of baseline data, the effort came to a halt. As of the time of writing (October 2001), the implementation phase of the project had not begun and the technical assistance had been completed.

Several explanations can be put forward to account for the failure to complete all planned-for activities: lack of funds and personnel within DIGESA, delays caused by governmental reorganization of DIGESA, and lack of security in Puerto Nuevo.

It is hoped that other sources of funds will be identified so that the next steps may be carried out:

- Printing of educational materials.
- Identification and training of promoters.
- Blood-lead tests: the first to start the intervention; the second, six months later to assess impact; and additional tests as appropriate and affordable.
- Facilitation of home improvements through a community credit fund to be implemented, not by DIGESA but by a nongovernmental organization (NGO).

About the time the project was initiated, a Negotiation Board was formed to consider the problems posed by the presence of mineral deposits in the area. It consisted of personnel from the Ministry of Mines, local government entities, managers from the mineral companies, DIGESA, and the Ministries of Health and Education. This board's technical advisor advised it to support DIGESA's behavior change program. If the board moves in this direction, more funding and support may be made available so that the implementation phase may begin.

Results to Date. Although implementation has not begun, several process-type results can be identified:

- Transference of behavior-change promotion skills to DIGESA personnel.
- Development of educational materials, including counseling cards, manuals for promoters and teachers, posters, stickers, etc.
- Research instruments for conducting formative research.
- Plans for implementation.

Lessons Learned. Several important lessons may be derived from the experience to date with this activity. Most concern the implementing agency, DIGESA. Roles and responsibilities of DIGESA personnel involved were not clear; personnel were expected to work on the project and continue at the same time to carry out their normal jobs; and DIGESA was unaware of the level of human and financial resources necessary for implementing behavior change. Thus, the following key lessons:

- Secure a clear agreement at the outset with agency directors to guarantee a stable project team.
- During the planning phase, define carefully the level of commitment required from the partners.
- Be sure the agency fully understands that behavior-change activities require a high level of work with the community.

Two more key lessons focus more on the community itself. As mentioned, it presented unusual—perhaps insuperable—difficulties. Thus, the following key lessons:

- Be sure that a detailed assessment of the situation is carried out before committing to a behavior-change activity. Prospects for success are significantly lower when the lead agency lacks experience in community development and behavior change and when the community itself lacks viable organizations.
- Program specific time for developing community participation, particularly in the absence of community groups and a spirit of community action.

Other important lessons include:

- Involve an NGO as partner to assure success in all steps and completion of the project.
- Involve a communications expert in the planning process to get a more realistic idea of the amount of funds needed for materials development.

1

Background and Overview

Starting Point: A Study of Blood-Lead in Greater Lima

Between July 1998 and January 1999, the Government of Peru's Environmental Health Division of the Ministry of Health (DIGESA) carried out a study of children and women to assess the extent of blood-lead poisoning in Lima and Callao, as part of activities related to removing lead from gasoline. DIGESA received technical assistance throughout the study from the U.S. Agency for International Development (USAID) through the Environmental Health Project (EHP) and from the Centers for Disease Control and Prevention (CDC). The study examined potential sources of lead exposure and related health effects of 2,510 children aged six months to nine years and 814 postpartum women. Children were selected from 21 recruiting centers, including schools in different districts of Lima and Callao and, for children aged six months to two years of age, four general hospitals. Women were recruited within 48 hours of giving birth from four maternity hospitals in Lima and Callao. (Early postpartum women were tested to obtain information regarding prenatal lead exposure and to estimate blood-lead levels of their babies at birth. Maternal blood-levels in early postpartum are highly correlated with lead levels in newborns.)

Measuring blood-lead levels is considered the primary measure of lead exposure. Almost every person has some detectable level of this metal in his or her blood. The American Academy of Pediatrics considers blood-lead levels below 10 µg/dL (micrograms per deciliter) as acceptable, while levels higher than 20 µg/dL are regarded as the threshold for initiating individual case management actions and levels of 45 µg/dL or more are considered as the threshold for initiating medical actions with chelating agents, provided the child can be permanently removed from significant sources of lead exposure.

The blood-lead survey in Lima and Callao found that the mean blood lead level among children sampled was 9.9 µg/dL. Twenty-nine percent of participants had blood-lead levels above 10 µg/dL, 9.4 percent above 20 µg/dL, and 1.6 percent above 45 µg/dL. The mean blood-lead level observed among the early postpartum women in the study was 3.8 µg/dL, with 24 percent showing levels higher than 10 µg/dL.

Blood-lead levels varied significantly by province, with Callao showing significantly higher levels than Peru: a mean blood-lead level of 7.1 µg/dL in children surveyed in Peru compared with a mean of 15.2 µg/dL among Callao subjects. High blood-lead levels were concentrated in two schools and a nearby health center, all located in Callao. The mean blood-lead level for children recruited in these institutions was 25.6 µg/dL. A visit to the area where children with high lead levels were detected revealed that the schools were close to a shipping port and to several storage areas

where numerous piles of mineral concentrates were exposed to open air. (The fine-grained concentrates are the product of ore grinding and processing.) The storage areas covered an estimated area of 147,000 square meters in the vicinity of the port in Callao. These facilities provide temporary storage for metals, metal concentrates, and other mining products before they are shipped by sea. Living near these areas is associated with an 18-fold increase in the prevalence of high blood-lead levels. Among the postpartum women, two who indicated the presence of mineral storage areas near their house had blood-lead levels nearly two times higher than other participants.

Water, dust, and soil samples were also collected in the vicinity of the mineral storage areas in Callao. All water samples analyzed were within normal limits (below 7 ppm—parts per million). In contrast, the lead concentration in 42 dust samples analyzed was high. The geometric mean was 358 ppm, with 30 percent of the tested samples above the recommended value of 500 ppm. The study found a strong inverse correlation between the distance from the storage area and the concentration of lead in the dust sample. Similarly, the mean blood-lead levels of children decreased as the distance between schools and the mineral storage areas increased.

The study also gathered information about behaviors that may increase the risk of lead exposure. Investigators asked parents or guardians about such behaviors as consuming soil, chewing or sucking pencils, placing hands in the mouth, and hand washing. While children who reported any behavior suggesting a high hand-to-mouth activity had higher blood-lead levels, only those who reported eating soil and chewing or sucking pencils had significantly higher blood-lead levels after adjustment for other variables. Eating soil was associated with a mean increase of 0.90 $\mu\text{g}/\text{dL}$ in blood-lead concentration and chewing or sucking pencils with an increase of 0.54 $\mu\text{g}/\text{dL}$. As expected, these practices increased the risk of high blood-lead levels: a 45 percent increase in high blood-lead levels for children who ate soil and a 41 percent increase for those who chewed or sucked pencils.

The study also documented some of the effects of lead. The team observed an inverse relationship between school performance and blood-lead levels: children with higher lead levels were more likely to have poor grades and to repeat a grade in school. Likewise an inverse relationship between anthropometry (growth measures) and blood-lead levels was documented.

The study is described in EHP Activity Report No. 72: *Estudio de plomo en sangre en población seleccionada de Lima y el Callao* (with executive summary in English).

Follow-up Activities Recommended

The study was reviewed in March 1999 by key stakeholders in Peru, and a series of follow-up activities was developed to:

- Better clarify sources of lead contamination.
- Determine the public health impact of the problem by expanding the blood-lead survey to include dwellers in the affected areas and workers in the depository areas.
- Decrease exposure by supporting the development of a risk management program, implementing community educational programs to reduce exposure, promoting the use of nutritional supplements to reduce lead absorption, and providing expertise in the management of dust problems.
- Increase DIGESA's response capabilities to address environmental problems related to lead, as well as to other contaminants.

It was not expected that all activities related to these goals would be supported by USAID. However, in early 2000, USAID did support a more detailed study in Lima and Callao to clarify the sources of lead contamination through lead isotope methodology. See EHP Activity Report No. 104. *Estudio para determinar las fuentes de exposición a plomo en la provincia constitucional del Callao, Perú* (with executive summary in English). This study honed in on the neighborhoods in the vicinity of the mineral storage areas. Children aged six months to seven years were screened, and results showed high lead levels in this population: mean blood-lead levels were 23 µg/dL, and 54 percent of the children had values of ≥ 20 µg/dL and 10 percent had values of about ≥ 40 µg/dL. These results underlined the urgency of initiating actions to decrease exposure.

“The proposed intervention is related to hygiene improvements to promote behavioral changes to improve personal hygiene and cleaning activities. Increased hand washing will be an important behavior change to reduce lead intake.” (EHP and CDC study. Activity Report No. 104. June 2000. *Estudio para determinar las fuentes de exposición a plomo en la provincia constitucional del Callao, Perú.*)

Development of the Project

On the basis of the studies described above, EHP was asked to provide technical assistance in the behavior change effort as part of USAID/Peru's Urban Environmental Health and Hygiene Behavior activity. This effort was to be part of a wider program to address environmental lead hazards, as indicated in the list of follow-up activities above. The present report describes the behavior-change technical assistance and the lessons learned.

The purpose of the project was to assist DIGESA to:

- Design, implement, and analyze formative research for a behavior-change program for reducing the blood-lead levels problem in Callao.
- Design a behavior-change program, develop educational materials, and test the feasibility of behaviors for reducing blood-lead levels in Callao.
- Provide guidance during the implementation, monitoring, and evaluation of the behavior-change program.

The project team consisted of a behavior-change specialist, who worked in Peru with DIGESA; a lead-poisoning expert, who was the U.S.-based resource; and a local consultant, who worked within DIGESA to assist with coordination of this project as well as other Peru Urban Environmental Health activities.

Major tasks of the project team were to:

- Train selected DIGESA staff in formative qualitative research needed to identify behaviors to target and to understand constraints to changing these behaviors.
- Provide guidance and assistance by email or phone during data collection.
- After collection of research data by DIGESA staff, assist the staff to
 - analyze the data and prepare a strategic plan of action for behavior change,
 - identify target behaviors,
 - develop and test educational materials,
 - initiate trials of improved practices (TIPs) to test the feasibility of the behavior-change strategy, and
 - draft baseline study instruments.
- Provide guidance and assistance by email or phone during application of TIPs, baseline study, and materials development.
- Assist the DIGESA team to develop a monitoring and evaluation plan.
- At the end of the demonstration project (approximately one year later), prepare a final report describing the process.

The proposed schedule was as follows:

- First temporary duty (TDY) of behavior-change consultant: July 2000
- Formative research by DIGESA team: July–October 2000
- Second TDY of behavior-change consultant: January 2001
- TIPs, development of materials, and baseline study by DIGESA team: January–March 2001
- Third TDY of behavior-change consultant: March 2001

The Project Area

The area chosen for the project was Puerto Nuevo, a neighborhood of about 6,000 residents located on the north side of the sea port city of Callao, the capital of the province of Callao. The government has invested heavily there to promote exports, especially the export of minerals from the Sierra. Although the areas around the pier were reserved for future expansion, beginning in about 1940, working class families began to settle there in makeshift dwellings. Later, efforts were made to expel the unlawful settlers but without much success.

The history of Puerto Nuevo has shaped its character. It is a slum area where just surviving is a challenge, where drugs, prostitution, juvenile delinquency, and violence are part of daily life. Homes lack water and sewage. Children are undernourished. Community organization and participation are weak; no nongovernmental organizations (NGOs) work thereat present. After about 50 years, the mayor granted residents titles to their property and promised to provide water and sewage and to improve the streets. Still, at present, the streets are unpaved, there are no sidewalks or green spaces, and government services like garbage collection, street lighting, police patrols, and the like, are not to be depended upon. The only community resources are a basketball court, a dilapidated public shower, a health center, and the primary school. Residents still behave as if they are living in a provisional, or temporary, community.

Lack of infrastructure, however, is not Puerto Nuevo's most serious problem. In spite of the presence of numerous industries and mineral storage areas, environmental regulations have not been enforced. The whole area is contaminated, not only on the sea side, but also inland. "El Chalaco," a Callao newspaper, using data provided by the mayor of Callao, reported that the harbor receives a permanent discharge of 3.2 mm³ of toxic substances per minute from the 24 factories of the area. The close-by airport is another source of air pollution and noise.

A major contaminant is lead coming from the three deposits located in and around Puerto Nuevo. Media presentations about two extreme cases of sick children speculated that lead contamination was the main cause. Under pressure from the

public, local and national authorities, as well as the owners of the mineral deposits, pledged to join forces to address the problem. Many possible solutions were considered, even clearly impractical options such as moving either the people of Puerto Nuevo or the seaport. After a more detailed analysis of the problem, the government has put in motion a number of actions. In the meantime, however, as these are being worked out, it is essential to educate the population about ways in which they can protect their children and themselves. Hence, Puerto Nuevo was deemed to be an ideal location for the behavior change demonstration project.

2 Public Health Goals

Lead poisoning in Puerto Nuevo occurs mainly by oral ingestion of dust containing lead particles, which are transported by air, food, utensils and hands. Respiratory absorption is relatively low according to the studies described in Chapter 1. Consequently, effective prevention should focus on interrupting the contaminate-mouth transmission pathway. Preventing oral ingestion of lead is similar to preventing ingestion of diarrhea-causing pathogens. Thus, in designing intervention strategies, the project relied heavily on the experience of diarrhea prevention programs in devising barriers that diminish or stop contamination.

The goal of the project was to diminish blood-lead levels among the population of Puerto Nuevo, especially among children aged six and under. Project planners considered including pregnant women as well as children; however, the technical group at DIGESA eventually decided against including this group as a primary target. Reasons were the lack of security in the area and reduced resources. However, most of the behaviors targeted for adoption will benefit not just the children but pregnant women also.

Children under six were targeted because they are more sensitive to lead poisoning, which can jeopardize their neurological development. Also, they have greater interaction with the environment: they play outside, get dirty, eat soil, etc. There are about 500 children under six years of age in the project area of about 6,000 families.

No specific percentage reduction in blood-lead levels was set as a goal. It is impossible to predict the amount of reduction in blood-lead that can be achieved by new behaviors. Further, lead absorption depends upon the lead concentration in the environment; that, in turn, varies according to the distance from the deposits.

“Given the high blood-lead levels observed among children in the neighborhoods that are close to the areas where mineral concentrates are stored, it is urgent to initiate actions to decrease exposure. Results from the environmental sampling study suggest that certain areas close to mineral concentrate storage have high lead in soils. This poses a risk to the children living in these areas, because children, as part of their normal activities, are known to normally consume at least between 80 to 135 mg (milligrams) of dust and soil per day, with more consumption likely in dry, dusty areas with poor hygiene.” (EHP and CDC study. Activity Report No. 104. June 2000. *Estudio para determinar las fuentes de exposición a plomo en la provincia constitucional del Callao, Perú.*)

Total elimination of lead exposure was not possible due to the amount of lead currently in the environment. The only way that lead contamination could be completely avoided would be to settle the entire population in another place or to

remove the deposits. Both options were unacceptable to the residents, mine owners, and government authorities. The only practical solution would be (1) to implement preventive measures intended to diminish people's intake of dust in their daily activities and (2) to reduce emissions of lead particles from stored deposits or minerals transported into the neighborhood. These measures should have a marked effect on lowering dangerous blood-lead levels.

CDC guidelines¹ state that the desirable blood-lead level for children is less than 10 µg/dL. Levels between 10 and 20 µg/dL call for efforts to decrease exposure and require frequent testing. Levels of 20 µg/dL or greater in children call for medical evaluation and investigation to identify sources of exposure that can be eliminated.

“High doses of lead can damage the nervous system, kidneys, and bones and can even be lethal. Even continuous low-level exposure causes lead to accumulate in the body and cause damage. It is particularly dangerous for babies before and after birth and for small children because their bodies and brains are growing rapidly. Children are more susceptible because they crawl on the floor and are more likely to put things in their mouths. Children also absorb lead more easily than adults and are more vulnerable to its effects.” (Internet: <http://www.cdc.gov/nceh/lead/lead.htm>)

During the formative research carried out by the DIGESA technical team as the first step in developing a strategy, residents exhibited a very lax attitude about the dangers and consequences of lead poisoning, even though they knew about the storage areas and had to fight every day with the black dust that seeps into their houses through small cracks or holes. There are several explanations for this lax attitude.

- The community lacks information about lead poisoning and its effects.
- The effects of lead poisoning are not visible; there are no symptoms such as a runny nose or a rash.
- Families are preoccupied with mere survival—insecurity, poverty, hunger.
- Adults argue that they have lived in Puerto Nuevo for 40 years and are capable of conducting businesses, holding jobs, etc. They are healthy, as their grandparents have been before them. In other words, there is nothing to fear.

According to the neighborhood health post, severe cases of lead poisoning have not been seen among Puerto Nuevo residents. This is highly unlikely. The more likely situation is that symptoms are prevalent but unrecognized due to a combination of lack of knowledge among health care professionals, lack of widespread blood-lead monitoring, and a lack of tools to measure the health effects, such as hearing, neurological development, and IQ.

¹ See, for example: “Blood Lead Levels in Young Children—United States and Selected States, 1996–1999,” *Morbidity and Mortality Weekly Report* 2000, Vol. 40, No. 50; Centers for Disease Control Facts on Lead (<http://www.cdc.gov/nceh/lead/guide/1997/docs/factlead.htm>).

It must be pointed out that health-post personnel are not trained to recognize and treat various levels of lead poisoning and related problems. According to technical literature, many symptoms that may be caused by lead poisoning may not have been recognized as such by health workers, as indicated in quotation below.

“Lead poisoning can cause a decrease in IQ and attention span as well as hyperactivity, behavioral disorders, reading disabilities, and, in extreme cases, coma and death. Experts say the condition is often irreversible, but sometimes it can be treated with special drugs that remove lead from the blood and cause the lead to be excreted in the urine. There is no cure for it or pill you can take to get rid of it, but you can prevent it. Expectations vary depending on the severity of toxicity. Children with levels above normal (greater than 30 micrograms/cc but less than 50) generally recover without problems. Children with medium and high serum levels of lead must be carefully followed and removed from all exposure. Children who have had an acute encephalopathy have a more guarded prognosis. Even mild lead poisoning is suspected as causing poor school performance and some loss in IQ.” (Internet: <http://www.cdc.gov/nceh/lead/lead.htm>)

3 Behavioral Goals

DIGESA, with the support of USAID/ Peru's Urban Environmental Health and Hygiene Behavior Activity, developed a comprehensive action plan to address the high amount of lead exposure, as measured by blood-lead levels, through behavior-change interventions.

The study found: "In Callao, children whose parents or guardians reported that they frequently washed their hands had close to a 2 µg/dL reduction in their mean blood-lead levels compared to other children in the same area. Community-based interventions to increase awareness of the routes of lead exposure in children and to modify hygiene practices can have important beneficial effects, especially if water availability increases at schools and in communities in Callao. This suggests that in the short run, community-based programs may be the only available risk-free intervention to protect children in the affected area of Callao." (EHP and CDC study. Activity Report No. 104. June 2000. *Estudio para determinar las fuentes de exposición a plomo en la provincia constitucional del Callao, Perú.*)

The first step in developing behavior-change interventions was to examine other experiences. The only other attempt to reduce lead poisoning through behavior change was an effort in Zlatna, Romania, from 1994 to 1997. After two years of community-based activities, average blood-lead levels fell from 40 µg/dL to 28 µg/dL among children under six years of age in the project area (Activity Report No. 45. *Summary of Activities in Zlatna, Romania. 1994–1997.* EHP-USAID). These results were obtained by promoting behaviors similar to those that DIGESA is proposing to promote in Puerto Nuevo.

Formative Research

In order to identify behaviors needing to be changed in Puerto Nuevo, formative research was conducted in the autumn of 2000. Through focus group discussions, household and community observations, and in-depth interviews of residents, the following themes were investigated:

- Basic hygiene in the home and in schools and communal areas.
- Acquisition, preparation, and consumption of food in the home, in schools, and in public eating establishments.
- Cleaning and decontamination of households, schools, and communal areas.
- Basic hygiene in the mineral storage and transport areas.

- Community participation in lead poisoning prevention and treatment.
- Activities of the health centers related to lead poisoning prevention and treatment.
- Perception of the danger of environmental lead in schools and the community.

Twenty focus groups, 22 observations, and 28 interviews were conducted. Annex 1 presents the basic formative research instrument (the form varied slightly depending upon the group with which it was used).

Results of Formative Research

The following were the major findings from the formative research, grouped into five categories.

Perceptions of the Problem

- *Community leaders, sports directors, and heads of religious brotherhoods.* Some were worried by the problem; others do not fear lead poisoning because they see that their parents and grandparents, who grew up in the community, are well. They recognize that they do not possess enough information about lead and think that the Ministry of Health should offer this information. Various ideas were put forward: move the school, close the deposits, move the community.
- *Managers of the deposits.* They recognize the problem and are taking action through monitoring air quality, placing green areas around the deposits, improving security and worker hygiene, and providing funds for making improvements in the schools. They believe the authorities are at fault since they allowed human settlements in an industrial zone.
- *Government officials.* They see lead as a health problem not only for the community but also for their workers. They believe that the municipality has used the press to alarm the population and to play politics with the lead problem.
- *Teachers.* They were not aware of the problem and knew very little about the health problems posed by ingesting lead. What they know is through the news.
- *Community members.* The majority do not perceive lead poisoning as a problem and have not taken any formal steps, through their leaders, to solve the problem. They have a high appreciation for the health center and its personnel.

Conditions of Hygiene at Home

- Poor hand washing—usually with water only and not soap.
- Lack of cleanliness in the kitchen (food preparation areas are not clean) and presence of dust on all the furniture, utensils, etc.
- Rags and mops used to clean the floors or tables are washed improperly or not at all.
- Laundry gets impregnated by dust, since it is done in the open.
- Lack of water service inside the house.
- Sanitation is through bucket latrines hauled away by persons willing to earn some money.

Conditions of Hygiene in Public Dining Facilities

- Waiters and cooks do not wear aprons.
- Dishes and glassware are not covered or protected from dust.
- Trucks transporting minerals to the port pass by, raising a lot of dust.

Conditions of Hygiene at School

- Virtually no hand washing with soap after playing in the school yard—even though a breakfast is provided after the play break.
- Washing facilities are too high to be reached by children under grade four; no soap is visible in washing facilities.

Community Organization and Participation

- A religious brotherhood made up of adult males and females and some young people carries out religious and social work. (They offered volunteers for visiting homes and made their place available for project meetings.)
- There are some sports clubs but no umbrella organization; no one takes care of the basketball court.
- A Central Committee is in charge of infrastructure and overall care.

- The Evangelical Church is active with youngsters.
- CORDELICA and ESLIMP, two central government community support agencies, have given trees to schools and have helped with small-scale community projects.

Community Communication

- Communications from schools through students and home visits.
- Announcements by loudspeakers on Sundays at the basketball court.
- Announcements during Sunday mass.
- Written communications from the Central Committee posted in the dining shelters.

Target Behaviors

Based on the findings of the formative research, a long list of behaviors that might be targeted for change were identified. The list was narrowed down using criteria that included recommendations from experts, feasibility of adoption, and potential for making an impact on the lead problem. Final selection of target behaviors was based on the results of the TIPs—trials of improved practices.

TIPs is a commercial marketing technique that has been adapted for social marketing. Commercial firms routinely test their products but such tests are not the norm in social or health projects. If “products,” such as new practices or behaviors, are not tested, projects may find that communities may be unwilling to adopt them for many good reasons. In a TIP, selected families are visited by project promoters at least twice, once to explain the benefits of the product or behavior and again to get feedback from the family after they have tried the behavior out for a period of the time. The families must agree to give the behavior a good try and to provide a frank evaluation of the extent to which they tried it out and information about the barriers that inhibit use or adoption.

TIPs was a new technique for the DIGESA team. Unfortunately the situation in which they applied it was far from ideal. As they began their work, a construction company began digging ditches for installing the new water system. Streets were closed to prevent theft of materials. This made it difficult to visit the families. Also, many families failed to cooperate. The neighborhood is suspicious and sometimes antagonistic to outsiders or officialdom; even the police and fire fighters have problems carrying out their tasks there. As a result of these problems, the number of families included in the TIPs was less than originally planned for. Eventually, 66 homes were visited.

On the basis of the trials, and other criteria as mentioned above, seven target behaviors were selected for their potential to significantly reduce children's lead ingestion. Note that it is the parents whose behaviors are targeted.

1. Wash your own and your children's hands with water and soap before meals.
2. Cut your children's fingernails once a week.
3. Before eating, wash fruits and vegetables with running water or in a basin until water runs clear.
4. Bathe your children and change their clothes every time they play outside.
5. Wash toys before giving them to children.
6. Before using, wash kitchenware and utensils.
7. Avoid dust penetration by closing cracks or holes in external walls or roofs

It proved to be easy to explain the *first three behaviors* in the TIPs and people were willing to try them and did not find many barriers to carrying them out. They were easy to incorporate into a housekeeping routine and did not require new learning. However, the *next three behaviors* (4 through 6) were not as well accepted. These called for new expenses to purchase clothes and soap and the extra burden of carrying and disposing of additional water. (In this connection, it is interesting to note that many of the homes are illegally connected to the water system through a single faucet, which, in most of the homes surveyed, is located in the family room about 40 centimeters above floor level. The floors of 80 percent of these houses consist of just packed dirt. Under these conditions, drinking and cooking water could easily be contaminated with dust-carrying lead particles.) The *last behavior*—closing cracks and holes—was not possible for most families because they could not afford home repairs. They did see the possible benefits, however.

The plan for implementing behavior change for preventing lead contamination focused on these seven key behaviors.

4 Behavior Change Strategy

The Basic Approach

After the formative research, behaviors that needed modification were identified and a behavior-change strategy was proposed. The proposal was presented to community focus groups for discussion and was found solid and acceptable. At the same time, concepts to convey the messages were tested through individual interviews and the most effective were incorporated as part of the communication strategy.

Stated briefly, the behavior-change strategy has two basic elements: visits by health workers to educate families about behaviors that can protect their children from lead poisoning, followed up by periodic blood tests to monitor the impact of behavior change. The health workers, or promoters, will be trained in techniques for interacting with households and will be given materials to use in explaining the blood tests and promoting behavior change. They will visit the families on a monthly basis.

The first blood-lead test will be the starting point for the intervention; the next will be six months later. Promoters will be trained to explain the meaning of the blood test levels to the parents and, in cases where children have missed scheduled blood tests, to motivate the parents to take their child to the health center to be tested.

Additional blood-lead testing will depend on the availability of funds. The owners of the mineral storage facilities will be asked to provide funds for blood testing.

Credit for Home Improvements

In addition to the basic strategy, the program aims to facilitate home improvements to prevent the entrance of lead. Establishment of a community credit fund will enable poor families to finance home improvements such as paving the floors and sealing cracks and holes in the walls and roof to prevent intrusion of contaminated dust. (Multivariate analysis showed that for each 1 $\mu\text{g/g}$ of lead dust in the interior of the house the blood levels of householders may increase by 6.2 $\mu\text{g/dL}$.)

The credit fund will have to be implemented through the support of an experienced external organization, since DIGESA doesn't have the necessary capability. Its local organizational structures are still too weak and underdeveloped. However, there is hope that an NGO may be identified to provide leadership for implementation.

Role of the Promoters

In order to achieve the necessary behavior change, many common practices must be modified, and these modifications need to be made within the particular constraints of each household. This necessitates personal visits to the households on the part of the promoters, who must develop special skills for communication and counseling. The group of promoters will be trained according a plan prepared with their participation. They will receive promotional materials and permanent support.

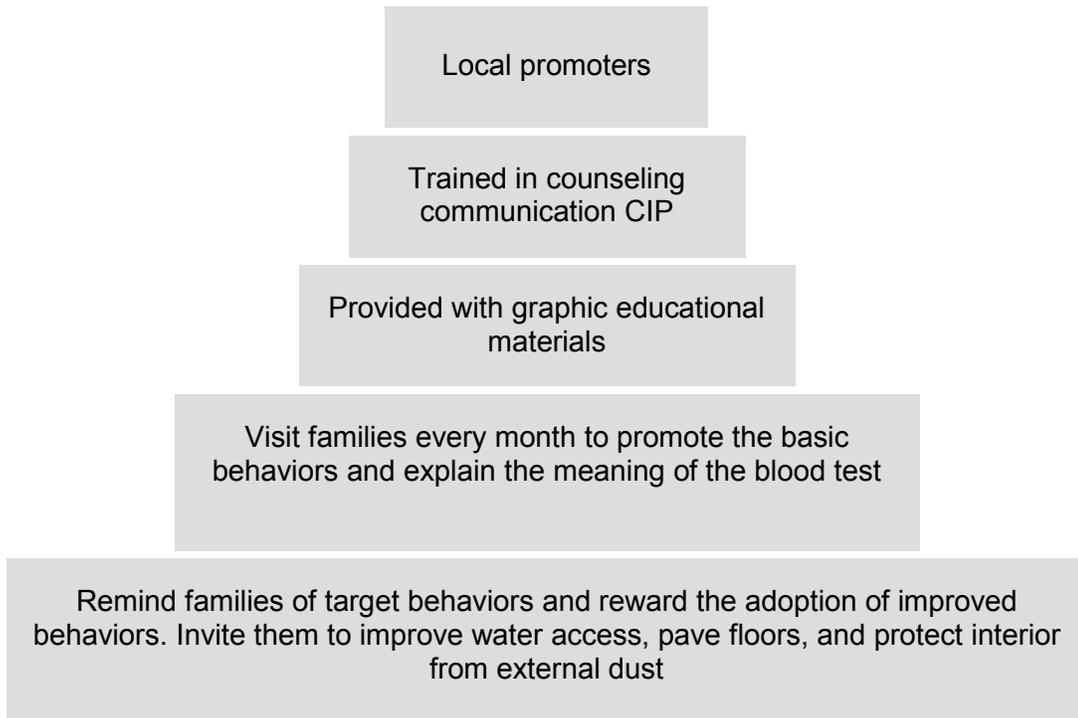
The strategy calls for at least 20 active female promoters, each responsible for 10 homes. Unfortunately, the number required is not available from the Puerto Nuevo health center. (Female promoters are preferred because many of the behaviors affect mothers or child caretakers—overwhelmingly female.) Volunteers from the community might make effective promoters. However, as mentioned before, organized groups are almost nonexistent in Puerto Nuevo and few people participate in community activities. Other options for identifying promoters must be developed.

Each promoter will receive a back pack with materials for distribution on the behaviors being promoted and a promoter's guide for making home visits. All households will be given stickers to affix to their faucets or water supplies, as a hand-washing reminder, and a poster illustrating the seven target behaviors. Promoters will also be given copies of a map, developed with the valuable participation of the local division of the Ministry of Health, showing all the houses where children under six live.

The behavior-change intervention will be launched by a festive assembly at the health center to encourage parents to bring their children in for an initial blood test. A card showing the level of lead in their children's blood will be given to parents after the test. A few days later, a promoter will visit the home to explain the meaning of the test. Every month, the promoter will continue visiting and encouraging the family to persist in the new behaviors. Each time the family states that they have adopted an improved behavior they will receive a purple heart sticker that can be affixed to the seven-behaviors poster to mark their progress. When all the behaviors needed to protect their children have been adopted, a special medallion will be hung over the house's main door as a testimony of the efforts made on the part of that household to prevent lead poisoning. Figure 1 shows visually how the strategy is organized. Annex 2 contains a list of the promotional materials prepared for the intervention.

Ideally, homes would be visited until the new behaviors are incorporated. In some homes, many visits might be necessary. However, the number of visits that DIGESA can carry out is limited by the funds it has available for training and support. Since DIGESA has been split in two, it is now less capable of supporting the lead behavior change program, only a small project viewed in relation to its scope of work. An effective approach would be to identify an NGO to sustain the intervention.

Figure 1. Behavior Change Strategy



5 Project Activities

Current Status of the Project

According to the scope of work, the formative research, strategy development, and materials preparation were supposed to lead to implementation by DIGESA of a demonstration project in Puerto Nuevo. However, as of October 2001, the demonstration project had not yet been launched.

Several events caused delays in the timing of proposed project activities. The new president of the Republic of Peru and his new administration brought about changes within DIGESA. The agency was re-engineered and split into two different institutions, one oriented to occupational diseases (INSO) and the other to environmental health (DIGESA). The behavior-change team remained in DIGESA but was reduced from sixteen to three persons.

In addition, the project was a strain on DIGESA human resources. Most of the activities carried out under the project dealt with collecting information from the community and using it to shape a plan of action suited to the particular situation. The DIGESA team had to be in constant contact with the community in time-consuming activities. These employees were used to working in their offices at their own desks, and the fieldwork was an unaccustomed and heavy burden. In addition, the team still had their normal responsibilities and work loads. That partially explains why the project activities were not completed as anticipated. At the time of writing this report, twelve months had elapsed and the project was still not finished. Approximately three more months will be needed to complete the sequence of activities.

The Negotiation Board

Just as the project was initiated, a board was created to consider the problems caused by the presence of mineral concentrates in the area. Members of the “Negotiation Board” were drawn from the Ministry of Mines, local governmental entities, managers from the mineral companies, DIGESA, the Ministry of Health, and the Ministry of Education. Their actions were focused primarily on controlling emissions of dust during transport from the deposits and adopting precautionary measures in handling minerals in the storage areas. The board also conducts periodic monitoring for the presence of lead in the environment to see the results of these actions.

The board consulted a technical advisor who reviewed the DIGESA behavior-change plan and advised the board to support it. As of the time of writing, negotiations between DIGESA and the board were ongoing. These may lead to funding and support for implementation of the demonstration behavior-change program developed

under the project. Although DIGESA no longer has the resources to implement the behavior-change activities by itself, the board does.

Stages and Activities

Before the project activities began, EHP and DIGESA started a dialogue to address the problem. EHP assigned a technical assistance team led by a senior advisor expert in behavior change to offer technical assistance, and DIGESA assigned to the project a team of social and scientific experts from among its ranks. They were charged with the double task of learning behavior change methodologies and applying them within the project community. The behavior change advisor worked closely with the DIGESA team, providing them with training, assisting them in the development of behavior change materials, and making himself available for consultation.

Sixteen technical professionals from DIGESA made up the original team. They had heterogeneous education, experience, and skills; they were psychologists, engineers, biologists, sociologists, social workers, nutritionists, and medical doctors. However, they had little experience in working in behavior change and formative research.

The project team also included experts from the Ministry of Health: a veterinarian with a lot of experience working with Puerto Nuevo residents, a social worker, and the health post director. The latter accepted responsibility for implementation of the demonstration project.

Figure 2 shows the stages of the project and related activities. The EHP consultant made three trips to assist the DIGESA team in the different stages. Between each visit, the team had to perform a set of tasks with the population.

In the first visit (August 2000), the consultant held a workshop on formative research; 14 members of the DIGESA team attended. The team learned techniques for research: direct observation, focus groups, in-depth interviews, and review of professional literature. Numerous practice sessions were carried out in the community. Together the team prepared structured questionnaires, focus group guidelines, in-depth interview guidelines, observation guidelines, field manual, and protocols. In the months following the workshop, the DIGESA team completed the formative research.

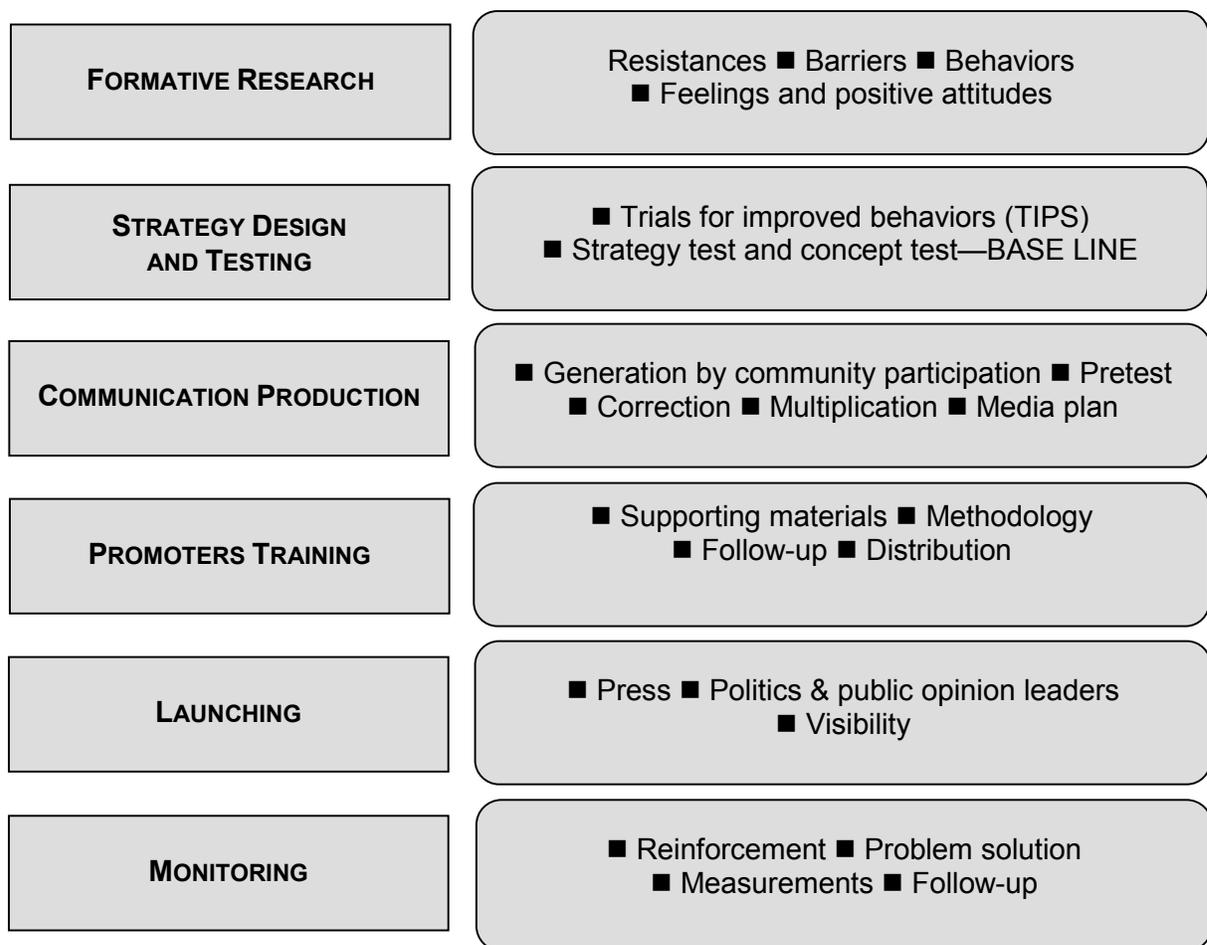
In the consultant's second visit (January 2001), a workshop was held on data analysis, design of behavior change interventions, and development of educational materials. Nine members of the DIGESA team attended. Again, in the months following the workshop, the DIGESA team applied what they had learned. They pretested the educational materials produced using the TIP approach (trials of improved practices).

The consultant's third and final trip took place in June 2001. Ten members of the DIGESA team attended a workshop in which the results of pretesting were reviewed and baseline data were developed. In addition, plans were discussed for the demonstration project in Puerto Nuevo, including project launch, training of promoters, and monitoring and evaluation.

As mentioned above, while preparatory work and planning have been done, the final three stages of the project have not yet been implemented: promoters training, launching the demonstration project, and monitoring the effort. EHP accepted responsibility for developing the process up to the point of implementation. At the time of writing, DIGESA was talking with the Negotiation Board to find an appropriate NGO partner to take up the burden of implementation under the leadership of the Puerto Nuevo health post.

Annex 3 is a copy of the Peruvian Ministry of Health’s report on the progress to date of the behavior change project to prevent lead poisoning.

Figure 2. Stages and Activities of the Behavior Change Intervention



6 Results

In this type of behavior-change project, three basic categories of results may be expected: one relates to the *process*, the second to *implementation and follow-up*, and the third to the *impact* of the project. Because the project has not reached the implementation stage, only process results can be given. Table 1 shows the results of process activities. Key results are as follows:

- *Transference of skills.* Although the project was not meant to be a formal training workshop, it did involve transfer of methodologies and institutional strengthening. Participants gained skills in key aspects of behavior-change management: formative research and analysis, strategy development, understanding constraints to behavior change, materials preparation and testing, developing training programs, and collection of baseline data. It was anticipated that the skills DIGESA team members attained would be used, not just for this project, but for other DIGESA activities. (Because DIGESA was not familiar with behavior change techniques, they originally assigned a large group—16 persons of different backgrounds—to participate full time in the project. It was soon apparent that the activity did not consist of a single workshop in which the behavior-change technique would be transferred in one blow. Instead the technique would be transferred gradually and through learning by doing. Because of their other responsibilities, the original group participated unevenly in the three workshops and practice activities. The effect was an uneven transference of techniques. Ultimately, three persons from DIGESA kept with the project throughout. This situation is not uncommon in public institutions and must be recognized as one of the barriers to implementing behavior-change programs.)
- *Educational materials.* The following educational materials were developed (see complete list in Annex 2):
 - Counseling cards for use by promoters.
 - A poster illustrating the target behaviors.
 - Reminder for blood tests.
 - Sticker for faucet.
 - Teachers guide booklet.

- Promoters guide booklet.
- Distinguished performance stars.
- *Research instruments.* Several research instruments were designed for conducting focus groups, interviews, and observations (see Annex 1).
- *Potential for benefit to at-risk population in Puerto Nuevo.* Many key pieces are in place to implement the demonstration project. At a relatively low investment on the part of EHP, a behavior change approach was installed at DIGESA by means of a project addressing USAID/Peru's concerns. In addition, the appropriateness of a behavior-change approach to the problem in Puerto Nuevo has been recognized by the newly established Negotiation Board to address problems of the mineral storage areas.
- *Plans for implementation.* A strategy for launching, implementing, and monitoring a demonstration project has been developed with options for implementation.

Table 1. Status of Project Activities

Stage	Activity	N	Product
Formative Research	Focus groups	12	Analysis and report (DIGESA team)
	Observations	12	Report (DIGESA team)
	In-depth interviews	12	Report (DIGESA team)
Community Involvement	Committee for improvement	1	Meetings
	Sporting club	1	Contact with leaders
	Religious organization	1	Meetings and collaboration
	Local school	1	Meetings and appraisal
	Health center	1	Participation in planning and leading the implementation
Strategy	Selection of behaviors	8	Power Point presentation
	Strategy test. Focus groups	10	Report (DIGESA team)
	Concept test. Focus groups	10	Report (DIGESA team)
	Plan of action	1	Power Point presentation
Educative Material Generation	Groups	4	Drafts produced by two artists
	Drafts	18	Organized by themes developed with groups
	Arts for pre-test	12	Organized according behaviors and plan
Pretest	Focus groups	3	Report (DIGESA team)
	Interviews	40	Report (DIGESA team)
Training	Plan	1	Draft from DIGESA team
	Guide booklet	1	Booklet with graphics
Base Line	Questionnaire	2	One version applied but not used
	Pretest	30	Produced final questionnaire
	Application	100	Pending
Survey to Locate Children and Establish Socio-demographic Indicators	Digitized map of Puerto Nuevo		Based on the Health Center previous development
	Questionnaire Application		Questionnaire and application was done by the DESA (Local directorate of the MOH in Callao)
Launching	Draft plan	1	Draft ideas for discussion (DIGESA)
Coordination and Follow-up	Proposal for the committee Institutions participating	1	Document and Power Point presentation prepared for USAID mission request
Materials to be Printed	Counseling cards	8	Ready to be printed
	Reminder	1	Ready to be printed
	Proof of behavior	1	Ready to be printed
	Performance stars for homes	1	Ready to be printed
	Flyer inviting for blood test	1	Ready to be printed
	Card showing test results	1	Ready to be printed
	Sticker for water containers	1	Ready to be printed

7 Lessons Learned

The following lessons, grouped by topic, are aimed primarily at persons and organizations attempting to provide technical assistance and support to behavior-change activities.

- *Roles and Responsibilities.* A difficulty faced by the project was the dual responsibilities of the DIGESA team; they were not only responsible for participating in training, practicing new skills, and implementing a new effort, but they were also expected to carry out the tasks that normally went with their jobs. This led to a high attrition rate during training and lags in the implementation schedule. The following lessons relate to this situation:
 - Secure a clear agreement at the outset with agency directors to guarantee a stable project team.
 - During the planning phase of the project, define carefully the level of commitment required from the partners.
 - Be sure that the agency fully understands that behavior change activities require a high level of work with the community.
- *Coordination.*
 - Establish an interdisciplinary local team.
 - Assign a group leader and assure that he or she is well supported by authorities.
 - Involve an NGO as partner to assure success in all steps and completion of the project.
 - Create a steering committee to provide political support as well as coordination.
- *Technical Assistance.*
 - Assure that the local consultant has ample time to oversee the activities of the DIGESA team.
 - Provide ample at-distance technical assistance days for the behavior-change consultant.

- *Connecting with the Community.*
 - Program specific time for developing community participation, especially if the community is not well organized.
 - Involve private groups that work in the area and have an interest in solving the problem being addressed.
 - Provide the behavior-change consultant with ample time at the outset to look for possible partners.
- *Budget.* Generally projects underestimate the budget for educational materials and formative research; design and production of materials are thus limited by available funds, whereas funds should be provided according to the needs.
 - Involve a communications expert in the planning process to get a more realistic idea of the amount of funds needed for materials development.
- *Understanding of Behavior Change.* Technologies that are not familiar to institutions attract much attention at the beginning but soon participation falls off. In this case the mandate of the institution does not cover direct work with specific populations. There was a tendency to rely too much on technical assistance. DIGESA was interested from the beginning in the transference of behavior-change technologies but was not aware of the commitment implied and the time required. On the basis of this experience, the institution will have to evaluate the feasibility of continuing to apply the methods learned. While DIGESA recognizes the need to apply behavior-change techniques in many other villages close to mine sites with worse or similar problems, it also now has a realistic idea of the amount of resources needed. DIGESA won't be able to make a completely informed decision, however, until the project goes through the implementation phase and the behavior change results are measured.
 - Be sure that a detailed assessment of the situation is carried out before committing to a behavior-change activity. Prospects for success are significantly lower when the lead agency lacks experience in community development and behavior change and when the community itself lacks viable organizations.
- *Institutions Undergoing Change.* There is a potential risk of not finishing what was started with institutions that are in the process of evolution and do not have an established profile. During implementation of this project, DIGESA became two institutions with a complicated profile.
 - Make sure that all aspects of the activity—transference of new techniques and development of plans, as well as the results of implementation—are monitored and evaluated so that even partial results may be documented and recognized.

Annex 1. Basic Formative Research Instrument

**PUERTO NUEVO. ENCUESTA DE LINEA DE BASE.
VERSION FINAL APLICADA**

ENCUESTA

Código:

ENTREVISTADO: _____ **FECHA:** _____

SALUDO Y PRESENTACIÓN

Buenos días, Sra. somos del Ministerio de Salud y quisiéramos que nos brinde unos minutos de su tiempo para hacerle unas preguntas que son importantes para el Ministerio de Salud, por eso le agradeceríamos que sea sincera en sus respuestas, todo lo que usted nos diga será totalmente confidencial.

(En caso de que no se encuentre la persona que cuida al niño pasar a otra casa.)

(a) IDENTIFICACIÓN Y COMPOSICIÓN DEL HOGAR

1. ¿Cuántos niños menores de 5 años hay en su casa? _____ *(Si hay más de uno pregunte):*
Que edad tiene el menor de ellos? _____

¿Usted que es de ese niño(a)? 1Madre() 2Hermana() 3Abuela() 4Otro _____

2. ¿Quién queda al cuidado de los niños? 1Madre() 2Hermana() 3Abuela() 4Otro _____

(b) COMPORTAMIENTOS

1. CUBRIR LAS RENDIJAS Y ESPACIOS DE PAREDES Y TECHO POR DONDE INGRESA EL POLVO

3. ¿Le molesta a Ud. que entre polvo a su casa? 1Si () 2No () *Pase a la pregunta 8*
4. ¿Por qué le molesta? 1 Por que tiene que limpiar más() 2 Porque afecta la salud()
3Porque todo se ensucia() 4Otro _____
5. ¿En qué lugar de su casa hay más polvo?
1Sala() 2Comedor() 3Cocina() 4Dormitorio() 5 Toda la casa ()
6. ¿Por dónde entra más el polvo a su casa? Marque una sola respuesta)
1Rendijas () *de: Pared () Techo () Puerta ()*
2 Otras: 1Tragaluz () 2Ventana () 3Patio () 4 N/s ()
7. ¿Tiene empapeladas sus paredes?
1Sí (*pase a la 9*) 2 Algunas 3 No 4No requiere (material noble)(*pase a la 9*)
8. ¿Por qué no ha empapelado sus paredes?
1Falta de tiempo () 2Falta de dinero () 3Recién se mudaron () 4No hay quien lo haga ()
5° Otro _____

2. LAVAR LAS MANOS DE LOS NIÑOS CON AGUA Y JABÓN ANTES DE COMER

9. ¿En este momento podría usted lavarle las manos a su hijo más pequeño? (*Observar y marcar en el cuadro las opciones*). Si no puede decirle: ¿Podría entonces explicar como lo hace desde que empieza hasta que termina?

Fuente de agua	Que utiliza	Secado
<input type="checkbox"/> 1Caño	<input type="checkbox"/> 1 agua	<input type="checkbox"/> 1 toalla / trapo limpio
<input type="checkbox"/> 2Lavatorio c/ agua	<input type="checkbox"/> 2 agua c/ jabón /detergent	<input type="checkbox"/> 2toalla / trapo sucio
<input type="checkbox"/> 3Lavatorio / jarra a chorro		

10. ¿En que momento le lava las manos a su niño más pequeño? *No decir las opciones (INSISTIR ¿Qué más? Anotar la 1º, 2º y 3º respuesta insistida)*
 1Antes de lactar() 2Antes de desayunar() 3Antes de almorzar() 4Después de jugar() 5Después de ir al baño() 6Cada vez que come algo () 8Otro _____

3. LAVAR LOS JUGUETES DEL NIÑO ANTES DE DÁRSELOS, SOBRE TODO LOS QUE MÁS JUEGA

11. ¿Acostumbra a lavar siempre los juguetes del niño(a)?
 1Si () 2A veces () 3No () *Pase a la pregunta 14*
12. ¿Cada cuánto tiempo los lava?
 1Diario () 2Una vez por semana () 3Más de 15 días () 4 No recuerda ()
13. ¿Cómo lava los juguetes? 1 Detergente / lejía / jabón, agua () 2 Agua sola ()
 3 Lavaza del lavado de ropa () 4 Trapo húmedo () 5Otro _____
14. ¿Estaría usted dispuesta a lavar los juguetes de su hijo/ antes de dárselos sobre todo los que más juega?
 1Si() 2No() 3Tal vez()

4. CORTAR LAS UÑAS DE LOS NIÑOS UNA VEZ A LA SEMANA

15. ¿Su hijo más pequeño se muerde las uñas? 1Si () 2No () 3A veces () 4Ns/nr ()
16. ¿Usted que hace cuando ve a su hijo/a más pequeño llevarse los dedos a la boca?
 1No se lleva () 2Lo corrige () 3No le hace caso () 4Le distrae con otra cosa ()
17. ¿Aproximadamente cada qué tiempo le corta las uñas a su hijo más pequeño?
 1A la semana () 2Cada 15 días () 3Al mes() 4Mas del mes() 5No le corta() 6No recuerda ()
Si responde cuando están grandes: Insistir ¿Cada cuánto tiempo?
18. ¿Estaría usted dispuesta a cortar las uñas a su niño una vez a la semana?
 1Si mucho() 2Un poco() 3No ()

5. BAÑAR CON MÁS FRECUENCIA A LOS NIÑOS

19. En verano, ¿Cada cuánto tiempo baña a su hijo más pequeño?
 1Diario() 2Interdiario () 3Una vez a la semana() 4Otro _____

20. En invierno, ¿Cada cuánto tiempo baña a su hijo más pequeño?
 1Diario() 2 interdiario() 3Una vez a la semana() 4Al mes() 5ºtro _____
21. ¿En que momento acostumbra a bañar al niño?
 1Después de jugar() 2Antes de dormir() 3Cuando lo ve sucio() 4Otro()

6. LAVAR LAS FRUTAS Y VERDURAS DE PREFERENCIA A CHORRO O EN DOS DEPÓSITOS HASTA QUE QUEDEN LIMPIAS

22. ¿Podría explicarnos cómo lava usted sus verduras, Por ejm: Apio, Poro, Culantro y Lechuga. *Marcar las opciones:*
 Deshoja () 1 Caño ()
 No deshoja () 2 En dos depósitos ()
 3 En un depósito ()
23. ¿Qué frutas consume más? *Enumerar en orden*
 1Plátano() 2Mandarina() 3Naranja() 4Papaya() 5Manzana()
 5Otro _____
24. ¿Lava todas las frutas antes de comerlas?
 1Si() 2Algunas() 3No lava() *Pase a la 27* 4No porque las pela()
25. ¿Qué frutas no lava? _____
26. ¿Cómo las lava? 1Directo en el caño() 2En dos vasijas() 3 Otro _____

7. LAVAR LOS UTENSILIOS DE COCINA ANTES DE USARLOS Y MANTENER CUBIERTA LA VAJILLA

27. ¿Cuándo lava los objetos de cocina, por ejemplo cucharones, coladores, ollas y otros objetos de cocina?
 1Después de usarlos() 2 Antes de usarlos() 3Antes y después de usarlos()
 4 No cocina en casa ()
28. ¿Dónde guarda estos objetos?
 1Sobre la mesa() 2En un cajón() 3Colgados en la pared() 4En un repostero cerrado()
 5En un repostero abierto() 6Colgados/ y en cajón() 7En Escurridor cubierto ()
 8En escurridor descubierto () 9 En un tablero debajo de la mesa ()
 10Otro _____
29. ¿Dónde guarda los platos, tazas y cubiertos después de lavarlos? *Insistir: ¿Es el escurridor cubierto? ¿Es el repostero cerrado?*
 1En un escurridor cubierto() 2 En un escurridor descubierto() 3En un repostero cerrado()
 4En un repostero abierto 5Otro _____
30. ¿Tiene caño en su casa? 1Si () 2No () *Pasar a la pregunta 33*
31. ¿Cuántos caños tiene? _____
32. ¿A qué altura aproximada del suelo está?
 1 A medio metro() 2A un metro() 3A metro y medio() 4 Otro _____

(d) **CONOCIMIENTOS SOBRE EL PROBLEMA DEL PLOMO**

33. ¿Algún miembro de la familia trabaja en los depósitos de mineral o trabaja con plomo?
 1.Sí () 2. No() 3. Sí pero no vive con nosotros ()

34. ¿Cree Ud. que el plomo cause daño? 1Si () 2No () *Pasar a la pregunta 37*
35. ¿Qué problemas puede ocasionar el plomo en salud?
1Problemas de aprendizaje () 2Retraso en el crecimiento () 3Anemia ()
4Otros _____ 5 No sabe _____
36. ¿A quiénes cree que afecta más el plomo? *Una sola respuesta*
1Niños () 2Adolescentes() 3Embarazadas() 4Ancianos () 5Mujeres ()
6Hombres () 7Todos ()
37. ¿Cómo puede saber que su niño tiene plomo?
1Examen de sangre() 2Examen médico() 3Por los síntomas 4Otro _____
38. Si se le informa que en Centro de Salud se va a hacer esta prueba, ¿Llevaría usted a su hijo para que le hagan la prueba?
1Si() 2No() Por qué? _____ 3No sabe/NR()
39. ¿Qué tanto estaría interesada en que le hagan esta prueba a su niño cada seis meses? *Leer opciones:* 1Mucho() 2Algo() 3Muy poco() 4No sabe/nr()
40. ¿Cuál sería la forma más efectiva para informarle sobre el examen?
1. volante 2. Perifoneo 3. Banderola 4. Centro Salud 5 Otro _____

LOS SIGUIENTES DATOS TÓMELOS POR OBSERVACIÓN

Dirección: _____

41. ¿Cómo es el suelo de los ambientes de la casa?

	Tierra	Cemento	Madera
Sala			
Comedor			
Cocina			
Dormitorios			
Otro			

42. ¿Cómo son las paredes de la casa?

	Tablas de madera	Material noble	Ambos	Otro
Sala				
Comedor				
Cocina				
Dormitorios				
Otro				

43. ¿Es esta casa también Comedor Popular? 1Si() 2No()
44. ¿Es esta casa también una tienda? 1Si() 2No()
45. ¿Observó polvo en los muebles? 1Poco() 2Mucho()

Despedirse. Agradecer el apoyo recibido.

Annex 2. List of Educational Materials

LOS MATERIALES PROMOCIONALES

- Hoja de Invitación a la toma de muestras que entregarán los estudiantes o las promotoras en las casas.
- Perifoneo
- Corazón adhesivo para marcar los avances en instalación de comportamientos
- Identificación para la puerta de la casa que ha incorporado todos los comportamientos

LOS MATERIALES EDUCATIVOS

- Manual de la Promotora. Contiene los conceptos y prácticas para explicar cómo se contamina, cómo se previene, sus efectos y cómo promover comportamientos
- •Tarjetas de Consejería con las cuales explican a las madres los comportamientos y negocian sus avances
- •Tarjeta que registro de las mediciones del plomo del niño que también explica como se contamina y sus efectos negativos.

LOS MATERIALES RECORDATORIOS

Un poster circular de 98 cm para exhibirlos en las casas. Contiene en forma gráfica los 8 comportamientos. Tiene un bolsillo para guardar la tarjeta del plomo

Un adhesivo que junto a la llave de agua recordará que debe lavarse las manos

Annex 3. Ministry of Health Status Report on the Project

PROYECTO PLOMO
INVESTIGACIÓN FORMATIVA PARA CAMBIO DE COMPORTAMIENTO
PUERTO NUEVO - CALLAO. 2000 - 2001

INFORME

1. ANTECEDENTES

Dentro del marco del estudio realizado por la Dirección General de Salud Ambiental (DIGESA), para determinar los niveles de plomo en sangre en niños menores de 9 años (1998 y 1999), y de acuerdo a los resultados obtenidos, se consideró la necesidad de realizar intervenciones educativas y comunicacionales enfocadas en las prácticas de higiene de la persona, vivienda y de la comunidad.

Por tal motivo fue capacitado un grupo de profesionales de la DIGESA y de la Dirección de Salud del Callao en un primer curso taller de Investigación Formativa para Cambios de Comportamientos, con la asesoría técnica de Marco P. Torres, consultor por USAID; diseñándose el proyecto de Investigación Formativa para Cambio de Comportamiento en el Asentamiento Humano Puerto Nuevo – Callao.

En la primera etapa, se realizó la investigación cualitativa, cuyos resultados fueron la identificación y selección de los comportamientos que podían mejorarse en las madres de familia de Puerto Nuevo.

En la siguiente etapa se desarrolló la estrategia a partir de los datos obtenidos en la primera etapa de la investigación, siguiendo los pasos de la metodología. Este trabajo se realizó en el segundo curso taller con el grupo de investigación y el Consultor por USAID Marco P. Torres, del 15 al 26 de Enero del 2001.

En la última reunión taller realizado del 12 al 16 de junio del presente año, se revisó los componentes de la estrategia de intervención: capacitación y comunicación, así como la línea de base.

La estrategia consiste en mejorar los comportamientos identificados y seleccionados, mediante la participación de Promotoras de Salud de la comunidad, quienes utilizarán la técnica de consejería personalizada, visitando a las personas responsables del cuidado y atención de los niños menores de 5 años, una vez al mes, esta visita de consejería buscará motivar y estimular a las madres de familia para mejorar sus comportamientos y así contribuir a la disminución de los niveles de plomo en sangre de los niños menores de 5 años.

2. OBJETIVOS

Mejorar los comportamientos de higiene de las madres de familia, para disminuir la contaminación por plomo.

Tener una respuesta directa y cercana sobre la factibilidad, interés y forma de poner en práctica los comportamientos que han sido seleccionados.

Diseñar un Programa de Cambios de Comportamientos, y probar la viabilidad de estas conductas para reducir la contaminación con plomo de los pobladores de Puerto Nuevo

3. ACTIVIDADES REALIZADAS

1. Investigación Cualitativa: mediante grupos focales, entrevistas en profundidad y observaciones in situ, con el fin de identificar los siguientes aspectos:

Percepción del problema del plomo y sus efectos en la salud.

Condiciones y prácticas de higiene.

Organización y participación comunitaria.

Acciones relacionadas con la salud.

Metodología	Realizadas
ENTREVISTAS	12
Observaciones	12
Grupos focales	12
TOTAL	36

2. Análisis del proceso

El grupo de trabajo realizó el análisis del proceso de la etapa de recolección de datos, mediante la metodología FODA (fortalezas, oportunidades, debilidades y amenazas).

ANALISIS FODA : GENERAL

POSITIVO:

NEGATIVO:

	FORTALEZAS	DEBILIDADES
INTERNO	<p>Equipo Multidisciplinario capacitado</p> <p>Facilidad Institucional (apoyo logístico)</p> <p>Apoyo de la Dirección de Protección de la Salud de los Trabajadores - DIGESA (secretarial: tipeo, impresión fotocopiado, etc.)</p> <p>Plan y Metas definidas</p> <p>Conocimiento de la zona por trabajo previo en la Comunidad.</p> <p>Interés Institucional por el tema</p> <p>Equipo comprometido.</p>	<p>Reclutamiento débil</p> <p>Diferente visualización del manejo de la metodología (según profesiones).</p> <p>Retraso de las actividades programadas por cruce de responsabilidades de los investigadores.</p> <p>Falta de apoyo secretarial y computadora.</p> <p>Reducción de número de investigadores y coordinadores.</p> <p>Falta de entrenamiento a reclutadores</p> <p>Falta de mayor número de reclutadores</p> <p>Falta Guías.</p>

	OPORTUNIDADES	AMENAZAS
EXTERNO	Apoyo de Autoridades Comunales Apoyo financiero y técnico de AID Disponibilidad de apoyo de Empresas Mineras (Centromin, Perubar). Disponibilidad de apoyo de Instituciones de P.N. (Colegio, Hermandad, Comité Central, Comedores Populares). Acceso al agua y alcantarillado.	Riesgo e inseguridad del grupo de investigación Trabajos de obras de agua y desagüe Delincuencia local (acorta el período de trabajo) Conflicto interno entre Directivos Población acostumbrada a asistir a reuniones por interés. Espacios limitados por reuniones de G.F.

3. ANÁLISIS DE LOS DATOS:

Luego de la recolección de datos, se elaboró el informe por cada actividad realizada. Estos informes fueron analizados en tres grupos de trabajo: grupos focales, entrevistas y observaciones.

Para facilitar el manejo de la información en el análisis de los datos, se han considerado áreas temáticas.

a. AREAS TEMATICAS DE ANÁLISIS

Percepción del problema del plomo y sus efectos en la salud.

Líderes de la comunidad.
 Directivos de empresa.
 Comunidad y escuela.

Condiciones y prácticas de higiene.

Hogar
 Escuela
 Depósitos de minerales (almacén y transporte)
 Comedores

Organización y participación comunitaria.

Organizaciones comunales (hermandad, Centro de Salud, Iglesia, comedores y Vaso de Leche)
 Participación y apoyo, grado y nivel en que se encuentran involucrados)
 Participación de empresas mineras, municipalidad, iglesia, otros.

Acciones relacionadas con la salud.

Alimentación y nutrición (embarazadas y niños)
 Uso de servicios de salud

4. RESULTADOS DEL ANALISIS:

- Los resultados del análisis son de tipo cualitativo.

1. PERCEPCIÓN DEL PROBLEMA DE PLOMO

- **Líderes de la comunidad**
- Escuela: Docentes

- Preocupación por el problema
- Opinan que el colegio debe funcionar en otro lado o cerrar los almacenes de minerales.
- Reconocen tener información provenientes de los medios de comunicación, pero refieren capacitación del MINSA.

Hermanidad: Directivos

- El plomo no es visto como un problema principal, refieren necesitar mayor información.
- No perciben el plomo como problema (porque los efectos no son notorios a la simple observación)

Directiva Central: dirigentes comunales

- El plomo no es visto como problema, ellos refieren que viven años en Puerto Nuevo, desde la época de sus abuelos y nunca han visto un caso grave por exposición a plomo.

Directivos de empresas:

- Empresa de Servicios de Limpieza Pública (ESLIMP):
- Consideran el plomo como un problema de salud para la comunidad y su empresa, por lo que han realizado campañas Educativas y donaciones de plantas en el Centro Educativo María Reiche.

Compañías mineras:

- Consideran un problema para la comunidad, por lo que han implementado un Programa de monitoreo de la calidad del aire.
- Han mejorado su programa de Seguridad e Higiene Ocupacional para los trabajadores en relación al Plomo.
- Consideran que el problema nace porque las autoridades permiten en la zona Industrial se asienten poblaciones.

Comunidad y Escuela:

- Escolares :
- No son conscientes del problema .
- Tienen ideas vagas del plomo , lo que saben es por los medios de comunicación y no por el colegio, sus padres, ni establecimientos de salud del MINSA.

Comunidad :

- Trabajadores eventuales residentes en Puerto Nuevo.
- Conocimiento distorsionado del problema de la contaminación por plomo.
- Opinan que el problema del plomo es causado por las empresas mineras.

2. CONDICIONES Y PRACTICAS DE HIGIENE :

Hogar :

- Falta de hábitos de higiene de las manos (No usan jabón)
- Falta de hábitos de limpieza de los muebles y menaje de cocina.
- No tapan los depósitos de basura., ni están ubicados adecuadamente.
- No descontaminan toallas, secadores ni trapeadores, estos no son lavados periódicamente.
- No tienen el habito de usar implementos de protección (mandiles, guantes)
- Falta de higiene de las personas que preparan los alimentos.
- La ropa lavada se encuentra expuesta al polvo

Escuelas: escolares

Falta de hábitos de lavarse las manos .con jabón.

Difícil acceso de los niños a los lavaderos de manos.

3. ORGANIZACIÓN Y PARTICIPACIÓN DE LA COMUNIDAD:

- Organizaciones comunales: Hermandad, Centro de Salud, Club de Madres.
- No hay organización para la limpieza comunal: loza deportiva.
- Pueden participar con incentivos
- La Hermandad puede apoyar con 40 jóvenes en visita de consejería casa por casa previa solicitud escrita.
- El Comité Central apoya en convocatoria y facilidades para que realicen el trabajo en PN
- La Iglesia evangélica apoya en convocatoria a través de sus líderes
- CORDELICA y ESLIMP están dispuestos a apoyar proyectos de mejoramiento en Puerto Nuevo
- Forma de difusión: a través de parlantes los días domingos cuando juegan fútbol, en la misa, a través de la directiva y los Comedores.
- El Centro de Salud organiza campañas de educativas de salud, la población acude a estas actividades.

4. PARTICIPACIÓN, APOYO Y GRADO EN QUE SE ENCUENTRAN INVOLUCRADOS

La población de Puerto Nuevo no ve como un problema la exposición al plomo.
La población y las organizaciones nunca han tratado de afrontar el problema del plomo.
Es difícil organizar a la comunidad, la gente solo colabora con incentivos.

5. PARTICIPACIÓN DE EMPRESAS MINERAS, MUNICIPALIDAD, ESLIMP, OTROS

ESLIMP: dona plantas al CE Maria Reiche para disminuir la contaminación, brindan charlas a los profesores, apoyan con desinfectante a través de los Comedores, Vaso de Leche, CEI, profesores y Padres de Familia.

Empresas mineras: acciones sociales, apoyo con vivienda y oferta de trabajo, mantenimiento del local del CE Maria Reiche y mejoramiento de áreas verdes al contorno de los depósitos.

Iglesia evangélica: apoyan con la limpieza del colegio y cuidado de jardín.

La opinión de la población de PN es que la participación del municipio esta en función de las denuncias por parte de la prensa, alarmando a la población siguiendo un criterio político sin cumplir su rol social en sentido negativo.

6. ACCIONES RELACIONADAS CON LA SALUD

Alimentación, nutrición, embarazadas, madres lactantes, niños

Los Comedores dan desayuno diario gratis a las familias inscritas, apoyan con un tarro de leche semanal.

Consumen pescado, verduras, papas.

7. USO DE LOS SERVICIOS DE SALUD

En caso de enfermedad acuden al Centro de Salud, las embarazadas reciben charlas, los enfermos de tbc reciben apoyo en el tratamiento, alimentación y charlas.

El personal del Centro de Salud realizan visitas domiciliarias.

5. INVESTIGACION PROBATIVA

Prueba de comportamientos mejorados TIPS: a través de visitas a los hogares en Puerto Nuevo, con la finalidad de motivar a las madres de familia con hijos menores de 5 años, para fomentar un determinado comportamiento, identificado en la investigación cualitativa.

- i. Así se probaron los comportamientos siguientes:

Tapar las rendijas por donde entra el polvo (paredes y techo de la casa).

Lavar las manos de los niños con agua chorro y jabón antes de comer.

Lavar los juguetes antes de dárselos, sobre todo los que más juegan.

Cortar las uñas de los niños una vez a la semana.
Bañar con mayor frecuencia a los niños.
Lavar las frutas y verduras antes de prepararlas, de preferencia a chorro o en dos depósitos hasta que queden limpias.
Lavar los utensilios de cocina antes de usarlos, y proteger la vajilla del polvo.
Acudir al control de plomo cada 6 meses.

6. GENERACIÓN DE MATERIALES EDUCATIVOS Y COMUNICACIONALES,

a través de entrevistas y grupos focales, que permitieron hacer los bocetos de los materiales educativos y de comunicación, con la participación de la población, que opinaron dando ideas al artista de acuerdo a los comportamientos seleccionados.

7. IMPLEMENTACION EN LA COMUNIDAD

Capacitación

Como parte de la estrategia de intervención se ha diseñado un plan de capacitación a diferentes grupos de personas involucradas en el problema (Anexo 1), con la finalidad de brindar información que permita la acción de la comunidad organizada: Promotoras de salud, líderes comunales, personal de salud, y comprende las siguientes actividades:

- **Actividades educativas**

Capacitación para Promotoras de Salud
Reunión Informativa con líderes de la población de Puerto Nuevo
Reunión técnica con personal de salud

Capacitación Para Promotoras de Salud:

- **Objetivo**
- Formar promotoras en acciones preventivas de daños a la salud por exposición al plomo para que sean facilitadoras en los cambios de comportamientos de riesgo y desarrollar las capacidades de la población para mejorar las condiciones de higiene.
- **Participantes:** 20 Promotoras de Salud de Puerto Nuevo
- **Duración:** 16 horas docentes.
- **Técnicas a Utilizar:** Exposición - dialogo, Trabajo de grupo.
Dinámica de Grupo: Juego de roles
- **Temario:** Efectos del plomo en la salud
 - a. . Como establecer una buena relación con las madres de familia
 - b. . Pasos básicos de la consejería
 - c. . Plan para mejorar la salud especialmente de los niños de Puerto
 - d. Nuevo

Reunión Informativa con líderes de Puerto Nuevo

Objetivos

Brindar información que permita a los líderes que se involucren en las medidas preventivas promocionales.
Que los líderes participen y apoyen las acciones de intervención educativa

Participantes:

Líderes de Puerto Nuevo y representantes de instituciones:
Vaso de Leche

Comité Central
Hermandad
Municipio
Centros educativos
SLIMP
Comedores populares
Técnicas a Utilizar: Exposición- dialogo. Mesa Redonda
Contaminación ambiental
Efectos del plomo en la salud
Plan para mejorar la salud especialmente de los niños de Puerto Nuevo

Reunión Técnica con Personal de Salud del Centro de Salud de Puerto Nuevo

Objetivos

Transferir conocimientos respecto a los efectos del plomo en la salud y las medidas de prevención y control.
Que el personal de salud se involucre y preste apoyo en las actividades de intervención educativa
Que el personal de salud puedan identificar, detectar e informar posibles problemas de salud por efectos del plomo.

Participantes: Personal del Centro de Salud de Puerto Nuevo

Técnicas a Utilizar: Exposición - dialogo

Temario

Contaminación ambiental
Efectos del plomo en la salud
Plan para mejorar la salud especialmente de los niños de Puerto Nuevo
Entrenamiento en el uso del Lead Care

Comunicación

Los materiales educativos que se utilizarán en el proceso de intervención han sido generados y validados con la participación de los diferentes grupos a los cuales están dirigidos, y son los siguientes:

Recordatorio, que contiene los ocho comportamientos.
Tarjetas de consejería, para uso de las promotoras de salud.
Guía de la promotora.
Cuaderno de Control para uso de la promotora.
Tarjeta de Control de plomo, para uso de la madre del niño.
Sticker Hogar Modelo, de estímulo para la vivienda que cumpla con los comportamientos.
Sticker Lavado de manos, para las viviendas.
Volante, para el control de plomo.

8. INVESTIGACIÓN CUANTITATIVA: LÍNEA DE BASE

- Aplicación de encuesta: Como punto de partida a la intervención, se realizará una Línea de Base, que se aplicará en una muestra representativa de la población de Puerto Nuevo, con la finalidad de conocer la situación actual de los comportamientos identificados y seleccionados, antes, durante y después de la intervención educativa y definir los que necesitan promoverse.
- **Determinación de niveles de plomo en sangre:** Paralelamente a la aplicación de la encuesta se tomarán muestras de sangre a los niños menores de 5 años.
- **Diseño Estadístico De La Muestra**

- i. La población a estudiar comprende 120 familias de Puerto Nuevo que tienen niños menores de 5 años, será seleccionada de acuerdo al censo realizado por la Dirección Ejecutiva de Salud Ambiental, que proporcionará los datos de viviendas con las características requeridas para tal fin.
 - ii. Procesamiento: Para el presente trabajo utilizaremos el paquete estadístico EPIINFO, con el que se obtendrá el tamaño de la muestra para estimar la proporción de familias con niños menores de 5 años en Puerto Nuevo, para el cambio de comportamiento.
- **Instrumento de Recolección de Datos**
 - i. La forma de recoger información es por medio de entrevistas individuales en base a un cuestionario pre-estructurado. (Anexo 4)
 - ii. El cuestionario es un INSTRUMENTO que requiere la total familiarización del entrevistador con el.
 - **Prueba del cuestionario:** La capacitación incluye la prueba en la zona.
 - Cada encuestador aplicará un número de encuestas - prueba.
 - Se considera la guía para la prueba del cuestionario.
 - Modificación del cuestionario.
 - Elaboración del cuestionario definitivo.
 - Elaboración de la guía definitiva para aplicar el cuestionario.

9. ACTIVIDADES PENDIENTES

- i. Impresión de los materiales.

Aplicación de la Capacitación

- ii. Reunión con grupo de investigación para presentación de plan de trabajo.
- iii. Reunión con Centro de Salud, para apoyo convocatoria a promotoras.
- iv. Reunión de coordinación con promotoras, confirmar compromiso y participación.
- v. Reuniones de capacitación (4 sesiones) a promotoras.
- vi. Capacitación (3 sesiones) al personal de salud: CS Puerto Nuevo, CS San Juan Bosco.
- vii. Reunión informativa con representantes de las instituciones sobre el plan de trabajo de intervención.

Lanzamiento

Definir plan de trabajo y cronograma.

Transferencia

Reunión de transferencia: DESA Callao, Centro de Salud de Puerto Nuevo.

Ps. Iris Ramos Miranda
C. Ps. P. 1751
Coordinadora de Investigación

Lima, Julio de 2001

INVESTIGADORES

Ps. Iris Margot Ramos Miranda	Coordinadora de investigación y Línea de base
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Ps. Liliana Aurora Vigil Romero	Capacitación
Blga. Shirley Moscoso Reátegui	Toma de muestra
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